AMENDMENTS TO THE CLAIMS

Claims 1, 3-12, 26, 38-49, 74, 91 and 175-192 were pending in the Application. Claims 26, 38-48, 74, 91, 179-182, 186 and 189 were allowed, claims 1, 3-6, 9-11, 49, 175-178, 183-185, 187, 188 and 190-192 were rejected, and claims 7, 8 and 12 were objected to in the final Office Action mailed January 23, 2008.

Claims 1, 3-12, 49, 175-178, 183-185, 187, 188 and 190-192 are currently canceled without prejudice or disclaimer. New claims 193-195 are claims 7, 8 and 12 rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Listing of Claims:

The following listing of claims replaces all prior versions, and listings, of claims in the application:

Claims 1-25. (Canceled).

Claim 26. (Previously Presented) A signal processing system, comprising:

a voice exchange for exchanging voice signals between a first telephony device and a packet based network;

a full duplex data exchange for exchanging data signals from a second telephony device with demodulated data signals from the packet based network, wherein the full duplex data exchange demodulates data signals from the second telephony device, outputs the demodulated

data signals to the packet based network, remodulates demodulated data signals from the packet based network, and outputs the remodulated data signals to the second telephony device;

a pitch period estimator for estimating a pitch period of a voice band signal from one or both of the first and second telephony devices, using an autocorrelation function;

signal power measurement circuitry for producing at least one measurement of power of the voiceband signal from one or both of the first and second telephony devices; and

a call discriminator for selectively enabling at least one of the voice exchange and the data exchange based at least upon a comparison of the pitch period estimate and a plurality of thresholds, and the at least one measurement of power of the voiceband signal.

Claims 27 – 37. (Canceled).

Claim 38. (Previously Presented) The signal processing system of claim 26 wherein the voice exchange comprises a voice decoder for decoding packets of the voice signals from the packet based network for transmission to the first telephony device, a voice activity detector which detects the voice signals without speech, and a comfort noise generator which inserts comfort noise in place of the voice signals without speech.

Claim 39. (Original) The signal processing system of claim 38 wherein the voice exchange further comprises a comfort noise estimator which generates comfort noise parameters from at least a portion of the voice signals without speech, the comfort noise generator being responsive to the comfort noise parameters.

Claim 40. (Previously Presented) The signal processing system of claim 26 wherein the voice exchange comprises a voice decoder for decoding packets of the voice signals from the packet based network for transmission to the first telephony device, a voice activity detector which detects lost voice signals, and a lost packet recovery engine which processes the voice signals to compensate for the lost voice signals.

Claim 41. (Previously Presented) The signal processing system of claim 26 wherein the voice exchange comprises a voice encoder for encoding the voice signals from the first telephony device for transmission on the packet based network, and a voice activity detector which suppresses the voice signals without speech.

Claim 42. (Original) The signal processing system of claim 41 wherein the voice exchange further comprises a comfort noise estimator which generates comfort noise parameters when the voice activity detector suppresses the voice signals without speech.

Claim 43. (Previously Presented) The signal processing system of claim 26 wherein the voice exchange further comprises a decoder for decoding packets of the voice signals from the packet based network, and an echo canceller for canceling decoded voice signal echoes on incoming voice signals from the first telephony device.

Claim 44. (Original) The signal processing system of claim 43 wherein the voice exchange further comprises a non-linear processor which mutes the incoming voice signals when the incoming voice signals do not comprise speech and the echo canceller detects the decoded voice signals with speech.

Claim 45. (Previously Presented) The signal processing system of claim 26 wherein the voice exchange comprises a voice encoder for encoding the voice signals from the first telephony device into voice signal packets for the packet based network.

Claim 46. (Previously Presented) The signal processing system of claim 45 further comprising a tone exchange comprising a dual tone multi-frequency (DTMF) detector for detecting a DTMF signal from the first telephony device and generating a DTMF packet for the packet based network in response to the DTMF signal, the DTMF detector muting the voice signal packets when the DTMF signal is detected.

Claim 47. (Previously Presented) The signal processing system of claim 26 further comprising a fax exchange for exchanging fax signals from a third telephony device with demodulated fax signals from the packet based network, wherein the call discriminator selectively enables the fax exchange.

Claim 48. (Previously Presented) The signal processing system of claim 47 wherein the fax. signals from the third telephony device are modulated by a voiceband carrier, and the fax exchange comprises a data pump for demodulating the fax signals from the third telephony device for transmission on the packet based network, and remodulating the demodulated fax signals from the packet based network with the voiceband carrier for transmission to the third telephony.

Claims 49-73. (Canceled).

Claim 74. (Previously Presented) A method of processing signals, comprising:

exchanging voice signals between a first telephony device and a packet based network;

demodulating data signals from the first telephony device for inputting to the packet based network;

remodulating demodulated data signals from the packet based network;

simultaneously exchanging demodulated data signals from a second telephony device with remodulated data signals from the packet based network;

estimating a pitch period of a voice band signal from one or both of the first and second telephony devices, using an autocorrelation function;

discriminating between voice signals and data signals based on a comparison of the estimated pitch period and a plurality of thresholds, and at least one power measurement of the voice band signal; and

invoking at least one of the voice exchange and the data exchange based on said discrimination.

Claims 75-90. (Canceled).

Claim 91. (Previously Presented) The method of claim 74 further comprising:

exchanging fax signals from a third telephony device with demodulated fax signals from the packet based network, wherein the discriminating comprises selectively invoking the fax exchange, and wherein the fax signals from the third telephony device are modulated by a voiceband carrier, and the fax exchange comprises a data pump for demodulating the fax signals from the third telephony device for transmission on the packet based network, and remodulating

the fax signals from the packet based network with the voiceband carrier for transmission to the third telephony device.

Claims 92-178. (Canceled).

Claim 179. (Previously Presented) A signal processing system, for interfacing telephony devices with packet-based networks, the system comprising:

a voice exchange for exchanging voice signals between a network line and a packet based network;

a full duplex data exchange for exchanging data signals from the network line with data signals from the packet based network, wherein the full duplex data exchange demodulates the data signals from the network line, outputs the demodulated data signals to the packet based network, remodulates demodulated data signals from the packet based network, and outputs the remodulated data signals to the network line;

wherein the data signals from the network line are modulated by a voiceband carrier, and the data exchange comprises a data pump for demodulating the data signals from the network line for transmission on the packet based network and remodulating the data signals from the packet based network with the voiceband carrier for transmission on the network line at a transmit rate; and

wherein the data exchange comprises a jitter buffer for receiving packets of the data signals of varying delay from the packet based network and compensating for the delay variation of the data signal packets by holding a number of the received data signals, and a clock synchronizer which adaptively adjusts the transmit rate of the data pump in response the number of the received data signals in the jitter buffer.

Claim 180. (Previously Presented) A signal processing system, for interfacing telephony devices with packet-based networks, the system comprising:

a voice exchange for exchanging voice signals between a network line and a packet based network;

a full duplex data exchange for exchanging data signals from the network line with data signals from the packet based network, wherein the full duplex data exchange demodulates the data signals from the network line, outputs the demodulated data signals to the packet based network, remodulates demodulated data signals from the packet based network, and outputs the remodulated data signals to the network line;

wherein the data signals from the network line are modulated by a voiceband carrier, and the data exchange comprises a data pump for demodulating the data signals from the network line for transmission on the packet based network and remodulating the data signals from the packet based network with the voiceband carrier for transmission on the network line at a transmit rate;

wherein the data exchange comprises a jitter buffer for receiving packets of the data signals of varying delay from the packet based network and compensating for the delay variation of the data signal packets by holding a number of the received data signals, and spoof logic which provides spoof data to the data pump when the number of the received data signals held in the jitter buffer is below a threshold.

Claim 181. (Previously Presented) A signal processing system, for interfacing telephony devices with packet-based networks, the system comprising:

a voice exchange for exchanging voice signals between a network line and a packet based network, wherein the voice exchange comprises a jitter buffer for receiving packets of the voice signals of varying delay from the packet based network and compensating for the delay variation of the voice signal packets, and wherein the jitter buffer comprises a voice queue which buffers

the received voice signals for a holding time, and a voice synchronizer which adaptively adjusts the holding time of the voice queue;

a full duplex data exchange for exchanging data signals from the network line with data signals from the packet based network, wherein the full duplex data exchange demodulates the data signals from the network line, outputs the demodulated data signals to the packet based network, remodulates demodulated data signals from the packet based network, and outputs the remodulated data signals to the network line; and

a tone exchange for exchanging dual tone multi-frequency (DTMF) signals between the network line and the packet based network, the DTMF exchange comprising a DTMF queue for buffering packets of the DTMF signals from the packet based network, and a tone generator which generates a DTMF tone responsive to the buffered DTMF signals, the DTMF queue outputting a signal to the voice synchronizer to suppress the buffered voice signals when the DTMF signals are in the DTMF queue.

Claim 182. (Previously Presented) A signal processing system, comprising:

a voice exchange for exchanging voice signals between a first telephony device and a packet based network, wherein the voice exchange comprises a decoder for decoding packets of the voice signals from the packet based network, an echo canceller for canceling decoded voice signal echoes on incoming voice signals from the first telephony device, and a non-linear processor which mutes the incoming voice signals when the incoming voice signals do not comprise speech and the echo canceller detects the decoded voice signals with speech; and

a full duplex data exchange for exchanging data signals from a second telephony device with demodulated data signals from the packet based network, wherein the full duplex data exchange demodulates data signals from the first telephony device, outputs the demodulated data signals to the packet based network, remodulates demodulated data signals from the packet based network, and outputs the remodulated data signals to the first telephony device; and a call discriminator for selectively enabling at least one of the voice exchange and the data exchange.

Claim 183-185. (Canceled)

Claim 186. (Previously Presented) The signal processing system of claim 26, wherein the estimate of pitch period of the voice band signal is calculated by applying an autocorrelation function and a plurality of power measurements to the voice band signal.

Claims 187-188. (Canceled)

Claim 189. (Previously Presented) The method of claim 74, wherein the estimate of pitch period of the voice band signal is calculated by applying an autocorrelation function and a plurality of power measurements to the voice band signal.

Claims 190-192. (Canceled)

Claim 193. (New) A signal processing system, for interfacing telephony devices with packet-based networks, the system comprising:

a voice exchange for exchanging voice signals between a network line and a packet based network;

a full duplex data exchange for exchanging data signals modulated by a voiceband carrier from the network line with data signals from the packet based network, the full duplex data exchange comprising:

a data pump for demodulating the data signals from the network line, outputting the demodulated data signals to the packet based network, remodulating the demodulated data signals from the packet based network with the voiceband carrier, and outputting the remodulated data signals to the network line at a transmit rate,

a jitter buffer for receiving packets of the data signals of varying delay from the packet based network and compensating for the delay variation of the data signal packets by holding a number of the received data signals, and

a clock synchronizer which adaptively adjusts the transmit rate of the data pump in response the number of the received data signals in the jitter buffer; and

a resource monitor that monitors processor resources during a call used by one or both of the voice exchange and the data exchange, and that dynamically enables and disables signal processing functionality used by the one or both of the voice exchange and the data exchange in the exchange of one or both of the voice and data signals of the call, to control processor computational load.

Claim 194. (New) A signal processing system, for interfacing telephony devices with packet-based networks, the system comprising:

a voice exchange for exchanging voice signals between a network line and a packet based network;

a full duplex data exchange for exchanging data signals modulated by a voiceband carrier from the network line with data signals from the packet based network, the full duplex data exchange comprising:

a data pump for demodulating the data signals from the network line, outputting the demodulated data signals to the packet based network, remodulating the demodulated data signals from the packet based network with the voiceband carrier, and outputting the remodulated data signals to the network line at a transmit rate,

a jitter buffer for receiving packets of the data signals of varying delay from the packet based network and compensating for the delay variation of the data signal packets by holding a number of the received data signals, and

spoof logic which provides spoof data to the data pump when the number of the received data signals held in the jitter buffer is below a threshold; and

a resource monitor that monitors processor resources during a call used by one or both of the voice exchange and the data exchange, and that dynamically enables and disables signal processing functionality used by the one or both of the voice exchange and the data exchange in the exchange of one or both of the voice and data signals of the call, to control processor computational load.

Claim 195. (New) A signal processing system, for interfacing telephony devices with packet-based networks, the system comprising:

a voice exchange for exchanging voice signals between a network line and a packet based network, wherein the voice exchange comprises a jitter buffer for receiving packets of the voice signals of varying delay from the packet based network and compensating for the delay variation of the voice signal packets, the jitter buffer comprising:

a voice queue which buffers the received voice signals for a holding time, and

a voice synchronizer which adaptively adjusts the holding time of the voice queue;

a full duplex data exchange for exchanging data signals from the network line with data signals from the packet based network, wherein the full duplex data exchange demodulates the data signals from the network line, outputs the demodulated data signals to the packet based network, remodulates demodulated data signals from the packet based network, and outputs the remodulated data signals to the network line;

a resource monitor that monitors processor resources during a call used by one or both of the voice exchange and the data exchange, and that dynamically enables and disables signal

processing functionality used by the one or both of the voice exchange and the data exchange in the exchange of one or both of the voice and data signals of the call, to control processor computational load; and

a tone exchange for exchanging dual tone multi-frequency (DTMF) signals between the network line and the packet based network, the DTMF exchange comprising a DTMF queue for buffering packets of the DTMF signals from the packet based network, and a tone generator which generates a DTMF tone responsive to the buffered DTMF signals, the DTMF queue outputting a signal to the voice synchronizer to suppress the buffered voice signals when the DTMF signals are in the DTMF queue.